



***Air Force Center  
for Environmental Excellence***

***U. S. Air Force Golf Course  
Environmental Management Program***

Presented by

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***AFCEE/ECE***



**Augusta National Golf Club  
Augusta, Georgia**



## **Golf and the USAF Mission**



# ***U. S. Air Force Golf Course Environmental Management***

- **Yesterday**
- **Today**
- **Tomorrow**
- **U. S. Air Force Golf Course  
Environmental  
Management  
(GEM) Program**
- **Conclusion**







## • Distant Past: (1400s)

- Little to no impacts
- Utilized marginal lands
- Set standards for golf courses that are still valid

- Existing contours
- Extremely natural
- Native grasses
- No irrigation
- Minimal maintenance



**Yesterday**

# ***Yesterday***



- **Recent Past: (70's, 80's & 90's)**  
**Golf Industry Comes Under Attack**
  - Pesticide use
  - Water use
  - Nitrogen & phosphate runoff
  - Wetlands
  - Habitat destruction
  - Water quality
- **Industry Self-Assessment**

## ***Potential Detrimental Effects of Golf Courses***

- **Contamination of surface water and runoff water**
- **Development of pest populations with increasing resistance to chemical control**
- **Negative impacts of chemical management on beneficial soil and non-target organisms**
- **Potentially toxic effects of chemicals to non-target plants & animals**
- **Excessive use of water resources**
- **Loss or degradation of wetland resources during construction and maintenance**



# ***U. S. Air Force Golf Course Environmental Management***

- **Compliance**

- **FIFRA**
- **FQPA**
- **CWA**
- **NEPA**
- **BASH**
- **NPDES**
- **ADA**
- **DoD Instructions**
- **Air Force Instructions**
- **Pesticide Reduction Initiative**



# ***USAF Golf Course Environmental Management***

- **Today (Mid 90s)**

- **Diverse groups such as**

- **United States Golf Association**
    - **Environmental Protection Agency**
    - **Golf Course Superintendents Association of America**
    - **Sierra Club**

- **Golf Summit**

- **Compiled Environmental Principles for Golf Courses**



# ***Environmental Principles***

- To enhance local communities ecologically and economically
- To develop environmentally-responsible golf courses that are economically viable
- To offer and protect habitat for wildlife and plant species
- To recognize that every course must be developed and managed with consideration for the unique conditions of its ecosystem
- To provide important greenspace benefits
- To use natural resources efficiently



## ***Golf & the Environment: Environmental Principles***

- To respect adjacent land use when planning, constructing, maintaining, or operating golf course
- To create desirable playing conditions through practices that preserve environmental quality
- To support ongoing research to scientifically establish new and better ways to develop and manage golf courses
- To document outstanding development and management practices
- To educate golfers, managers, and the public



**Today**

# ***Tomorrow***

- **Where do we start?**





# ***Tomorrow***

- **Air Force Golf (Services)**

- **Forged new alliance**
- **Provided funds**
- **Guaranteed support**



- **Result:**

- **AFCEE now AF Golf's environmental consultant**
- **U. S. Air Force Golf Course Environmental Management Program initiated**



## ***U. S. Air Force Golf Course Environmental Management***

- **GEM Program goals**
  - **Minimize potential negative environmental impacts from golf course management practices**
  - **Support the installation mission**
  - **Minimize new requirements for golf staff**

# ***U. S. Air Force Golf Course Environmental Management***

- **Golf Course  
Environmental Management  
Planning Process**





# ***Golf Course Environmental Management Planning Process***

- **5 Phases-**
  - **Assessment**
  - **Documentation**
  - **Implementation**
  - **Evaluation**
  - **Revision**

## ***Golf Course Environmental Baseline Assessment***

- **Assessment- The GCEBA Process**
  - Site visit, interviews, & data collection
  - Course specific analysis
  - Environmental Compatibility Quotient (ECQ) checklists
  - Identification of environmental challenges
  - Summary report (GCEBA)

## ***Golf Course Environmental Baseline Assessment***

- **FY 02 GCEBA Visits (AF Golf \$)**
  - **Hurlburt Field, FL**
  - **Patrick AFB, FL**
  - **Nellis AFB, NV**
  - **Dover AFB, DE**
  - **Air Force Academy, CO**
  - **Edwards AFB, CA**
  - **Lackland AFB, TX**

# ***Golf Course Environmental Baseline Assessment***





# ***Golf Course Environmental Baseline Assessment***

*Air Force Center for Environmental Excellence*



**Gator Lakes Golf Course**  
**Environmental Baseline Assessment**  
Hurlburt Field, Florida      Mar 02



# Hole-by-hole Analysis

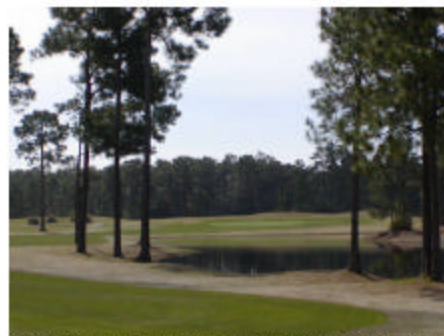
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## Hole #11- 385 Yards, Par 4

### DESCRIPTION

Toughest and most attractive hole on the course! The 11<sup>th</sup> challenges all players from the tee shot to the tap in. A long, flowing dogleg right demands the stronger drivers of the ball to gently bend the tee shot or face going through the fairway into the pines. An accurate drive is just the first test. The large pond continues almost to the green further challenging the player's ability to hit solid, accurate shots. Greenside sand bunkers do not often come into play but the back right pin placement is always tough.



*It usually takes four well played shots to handle the unique par-5 10<sup>th</sup>.*



*Postcard-like beauty of the 11<sup>th</sup> dazzles from behind the green.*

### OBSERVATIONS

- Landing area is a scant 90 feet wide
- Hole borders on being too scary for the all-too-common right-handed slicer to play
- Bluebird box adds to overall environmental sound experience
- Excellent golf hole

# Golf Course Environmental Baseline Assessment

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Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is fuel storage/delivery managed in accordance with federal, state and local regulations?	✓		
2	Are installation environmental staff members included in on-going course management discussions and plans at regularly scheduled meetings?			✓
3	Are there regularly scheduled staff meetings to discuss environmental management issues?		✓	
4	Does the director of golf and the superintendent attend ECAMP in-briefings and out-briefings?			✓
5	Does the director of golf and/or the superintendent coordinate with installation environmental staff on the various management plans that affect or include the golf course?		✓	
6	Are MSDSs readily available for all required substances?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are containers used to store used oil in good condition, not leaking, and clearly labeled?	✓		
9	Are oil/water separators operating properly and correctly maintained?	✓		
10	Are written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? - the quantity of each pesticide used - the chemical or common name of the active pesticidal ingredient(s) (not the product name) - the pest or purpose for which the pesticide was applied - the date and place of application	✓		
Point totals for each column - Response percentage		6	2	2

# Golf Course Environmental Baseline Assessment

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## ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	4	3	3
2	Safety, Training, & Awareness	7	1	2
3	Compliance	6	2	2
4	Course Playability	6	2	2
5	Pollution Prevention	8	1	1
6	Conservation Practices	6	0	4
7	Aesthetics & Naturality	8	1	1
8	Maintenance Practices	8	1	1
9	Customer Relations and Education	7	2	1
10	Miscellaneous Special Projects & Activities	7	2	1
Composite points & response percentage		67	15	18

## GCEBA Results

- \* Gator Lakes Golf Course, Hurlburt Field, FL
- Actual ECQ (# of "Yes") = 67 "Early Stages"
- Potential ECQ (Actual ECQ plus "Partial") = 82 "Showing Progress"

Environmental Baseline Assessment

Gator Lakes Golf Course, Hurlburt Field, FL

# ***Environmental Compatibility Quotient***

- **Two ways to use the ECQ checklists:**
  - **Actual ECQ**= The total percentage of “Yes” responses to all ten checklists
    - Where we are today
  - **Potential ECQ**= The Actual ECQ plus the total percentage of “Partial” responses to all ten checklists
    - Where we could be tomorrow with a little effort and support



# Golf Course Environmental Baseline Assessment

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## Environmental challenges

One of the important results of the GCEBA process is the identification of significant issues or challenges that should be addressed in the long term GEM Planning process. Ideally, the golf staff will address each issue from the best way to satisfy the goals of the golf facility and acceptable levels of course playability and customer satisfaction. The golf staff's preferred management approach for these issues should then be coordinated with the installation's environmental staff for refinement, coordination, and approval.

The GEM Plan would then consist of the environmental challenges, the approach to their management, a map showing where these challenges occur on the golf course, a booklet that describes the mapped challenges, goals and objectives for future years, and a set of best management practices.



*A diverse natural wildlife population thrives on Hurlburt Field.*

The following environmental challenges were identified during the GCEBA process at Gator Lakes Golf Course, Hurlburt Field, FL:

- Audubon Cooperative Sanctuary Program
- Wetlands, watershed protection, & water quality management
- Tree management
- Invasive exotics
- Hazardous waste management
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Excessive biological oxygen demand
- Protected fauna & flora

## AUDUBON COOPERATIVE SANCTUARY PROGRAM

Under a discussion of an issue to enhance habitat for urban wildlife, the Integrated Natural Resources Management Plan (INRMP) recommends that Gator Lakes Golf Course obtain certification status in the Audubon program. Although the program is internationally recognized for its contribution to the increased environmental stewardship of golf courses, increasing wildlife habitat should not be the reason. U. S. Air Force golf courses almost should never manage with a goal to increase wildlife habitats. We can take credit for habitat we already have, but we may actually want to manage these areas to reduce rather than increase wildlife numbers. The prescribed airtield mowing procedure is a prime example. We must never forget, the mission of the golf course is to provide recreational opportunities on quality turf while supporting the overall mission of the U. S. Air Force.

Environmental Baseline Assessment

Gator Lakes Golf Course, Hurlburt Field, FL

# ***Golf Course Environmental Baseline Assessment***

- **Environmental Challenges-**

## **Gator Lakes G. C., Hurlburt Field, FL**

- **Audubon Sanctuary Program**
- **Wetlands, watershed protection, & water quality management**
- **Tree management**
- **Invasive exotics**
- **Hazardous waste management**
- **Excessive biological oxygen demand**
- **Protected fauna & flora**



**Gator Lakes Golf Course,  
Hurlburt Field, FL**



# ***Golf Course Environmental Baseline Assessment***

- **Environmental Challenges-**

## **Manatee Cove G. C., Patrick AFB, FL**

- **Invasive exotics**
- **Audubon Sanctuary Program**
- **Bird/Wildlife Aircraft Strike Hazard (BASH)**
- **Threatened & Endangered Species**
- **Water quality management**



**Manatee Cove Golf Course,  
Patrick AFB, FL**



# ***Golf Course Environmental Baseline Assessment***

- **Environmental Challenges-**

## **Sunrise Vista G. C., Nellis AFB, NV**

- **Ecosystem management**
- **Invasive exotics**
- **Water use**
- **Water quality management**
- **Bird/Wildlife Aircraft Strike Hazard (BASH)**
- **Threatened & Endangered Species**



**Sunrise Vista Golf Course,  
Nellis AFB, NV**

# ***Golf Course Environmental Baseline Assessment***

## **• Environmental Challenges-**

### **Eagle Creek G. C., Dover AFB, DE**

- Watersheds, wetlands, floodplains, & water quality management**
- Bird/Wildlife Aircraft Strike Hazard (BASH)**
- Threatened & endangered species**
- Air quality**
- Biodiversity enhancement**
- Installation Restoration Program (IRP) sites**
- Pest management**





**Eagle Creek Golf Course,  
Dover AFB, DE**

# ***Golf Course Environmental Baseline Assessment***

- **Environmental Challenges-**

- Muroc Lake G. C., Edwards AFB, CA**

- **Environmental Compliance & Management Program (ECAMP)**
    - **Pesticide use & integrated pest management (IPM)**
    - **Natural resource management**
    - **Water use**
    - **Bird/Wildlife Aircraft Strike Hazard (BASH)**
    - **Threatened & endangered species**
    - **Proposed maintenance facility**
    - **Tree management & landscape development**





**Muroc Lake Golf Course,  
Edwards AFB, CA**

# ***Golf Course Environmental Baseline Assessment***

- **Environmental Challenges-**

## **Eisenhower G. C., Air Force Academy**

- **Invasive exotics & vegetation management**
- **Threatened & endangered species**
- **Proposed golf course expansion**
- **Natural resources management**
- **Maintenance facility Environmental Restoration Program (ERP) site**
- **Bird/Wildlife Aircraft Strike Hazard (BASH)**
- **Water use & conservation**





**Eisenhower Golf Club,  
Air Force Academy**

# ***Golf Course Environmental Baseline Assessment***

- **Environmental Challenges-  
Gateway Hills & Valley Golf Courses,  
Lackland AFB, TX**
  - **Bird/Wildlife Aircraft Strike Hazard (BASH)**
  - **Water use & conservation**
  - **Water quality management**
  - **Installation Restoration Program (IRP) sites**
  - **Floodplains**
  - **Air quality**





**Gateway Hills & Valley Golf Courses,  
Lackland AFB, TX**



## ***FY 02 GCEBA Visits Lessons Learned***

### **• ECQ Categories**

- **Overall Management Philosophy & Documentation**
- **Safety, Training, & Awareness**
- **Compliance**
- **Pesticide Use, Handling, & Storage (Course Playability)**
- **Pollution Prevention**
- **Conservation Practices**
- **Water Resources (Aesthetics & Naturality)**
- **Maintenance Practices**
- **Customer Relations & Education**
- **Miscellaneous Special Projects & Activities**

## ***FY 02 GCEBA Visits Lessons Learned***

- **Environmental Compatibility Quotient (ECQ) = baseline**
  - Should only be used to determine current level of environmental compatibility
  - Needs to be a follow-up the GCEBA to document progress
    - Survey ?
    - Self assessment using checklists ?
    - Re-visit and re-assess ?

## ***Golf Course Environmental Baseline Assessment***

- **FY 03 GCEBA Visits (AF Golf \$)**

- **Robins AFB, GA**
- **Hickam AFB, HI**
- **Vandenberg AFB, CA**
- **RAF Lakenheath, England**
- **Travis AFB, CA**
- **Altus AFB, OK**
- **Whiteman AFB, MO**

# U. S. Air Force Golf Course Environmental Management Web page

AFCEE HOME | ORGANIZATIONS | SEARCH | PRODUCTS | PERSONNEL



## U.S. Air Force Golf Course Environmental Management

### Gateway Hills Golf Course, Lackland AFB, TX

#### Index

- Environmental Conservation and Planning Directorate
- Home
- Program Overview
- Program Background
- GEM Program Process
- Participating Courses
- Products
- Services
- Regulatory Updates
- Archives
- ForeM
- Links
- Air Force Golf

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**Course designer:**  
 CDE, Joe Finger (Final)  
**Year constructed:**  
 1940, 1940-50

**Par:** 35-28-72  
**Yardage/Rating/Slope:**  
 Blue: 6017/73.1/125  
 White: 6549/71.2/113  
 Gold: 5816/67.7/112  
 Red: 5437/71.5/116

**Climate:** Coastal, sub-tropical  
**Avg. annual rainfall:** 29"  
**Avg. growing season:** 270 days  
**Winds:** Prevailing Direction: NE & SW

[AF Golf Directory](#)



#### Course Description

Gateway Hills Golf Course enjoys a well-deserved reputation as providing the best golf experience for the money in south central Texas. Diverse, beautifully sculpted holes expertly dropped over the natural, rolling terrain. Bud Gentle and his friendly, able staff maintain the links to the highest possible standards. Superintendent Leroy Kouse is one of the most experienced in the U.S. Air Force and is dedicated to providing a positive golfing experience. An aged irrigation system is scheduled for replacement and should ease many of the difficulties currently encountered in growing and maintaining high quality turf in all "in-play" areas.

The course is blessed with a diverse stand of mostly native tree species. Leon Creek, which bisects and drains the course property, comes into play several times as the course's only water hazard, increasing the challenge of Gateway Hills. Most of Leon Creek's meandering path has been presented in its natural form, greatly enhancing the aesthetic quality of the property while functioning as a valuable wildlife corridor.

#### Thumbnails



**Course Manager:** Bud Gentle  
**Superintendent:** Leroy Kouse  
**Tee:** 2 zone - 419 Hybrid Bermuda grass  
**Fairways:** 65 Azevedo - Common Bermuda grass



# ***Golf Course Environmental Management Plan***

## **• Documentation- The GEM Plan**

- Environmental policy statement**
- The GCEBA Report**
- List, description, and map of, and management approach to environmental challenges**
- Goals, objectives, and plans for improving environmental stewardship**
- List of Best Management Practices**
- Share information with customers**

# ***Golf Course Environmental Management Plan***

- **Implementation**

- **Compile and publish GEM Plan in the next update of the Integrated Natural Resources Management Plan (INRMP)**
- **Document changes in procedures and apply ECQ to determine new baseline and document improvement**
- **Monitor all chemical/fertilizer inputs**
- **Start scouting and map all pests**

# ***Golf Course Environmental Management Plan***

- **Evaluation**

- **Regularly examine maintenance methods, practices, and management processes to minimize or eliminate potential negative environmental impacts**
- **Demonstrate flexibility and ability to change**

# ***Golf Course Environmental Management Plan***

- **Revision**

- **Regular GEM Plan updates should occur every 3-5 years or whenever INRMP is updated**
- **Act on lessons learned**
- **Constantly look for ways to improve environmental stewardship**



# ***U. S. Air Force Golf Course Environmental Management***

- **Conclusion**
  - **The Four Laws of Ecology**



## ***The Four Laws of Ecology: “Aphorisms to Live By”***

- **Law #1**
  - **Everything is connected to something else.**
- **Law #2**
  - **Everything must go somewhere.**
- **Law #3**
  - **Nature knows best.**
- **Law #4**
  - **“There’s no such thing as a free lunch.”**

# ***U. S. Air Force Golf Course Environmental Management***

- **Example:**
  - **Carolina Lakes Golf Course,  
Shaw AFB, South Carolina**

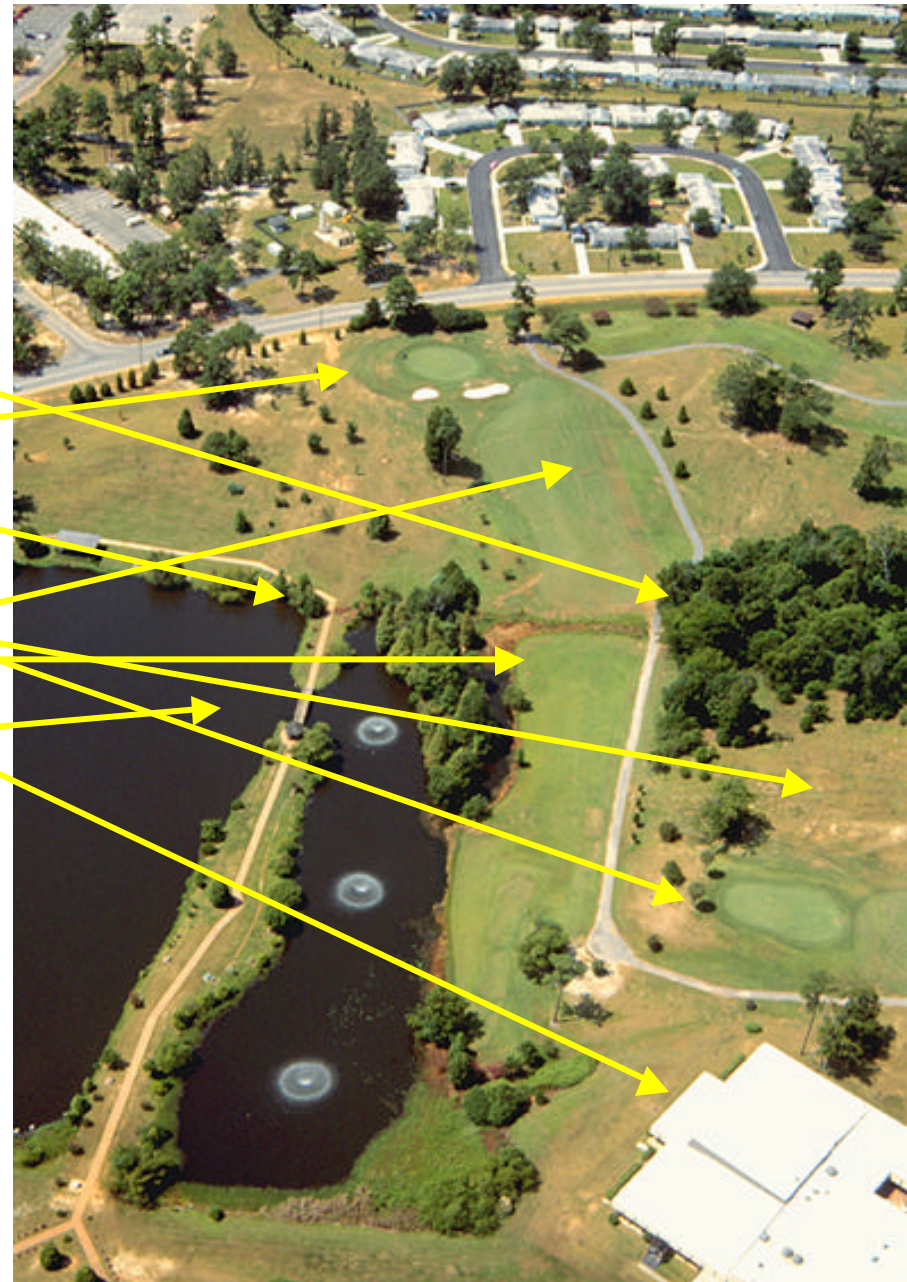




## # 12 - Shaw AFB, South Carolina

### • Compliance Issues

- Clean Water Act  
(Section 404)
- NPDES
- FIFRA
- FQPA
- DoD Instructions
- Air Force Instructions
- NEPA
- BASH







**Conclusion**

# ***U. S. Air Force Golf Course Environmental Management***



## ***U. S. Air Force Golf Course Environmental Management***

- **AFCEE Golf Support Unit**
  - **Interdisciplinary group with representatives from each of AFCEE's directorates**
  - **Goal:**
    - **Provide integrated, timely, comprehensive, and technically accurate customer service**



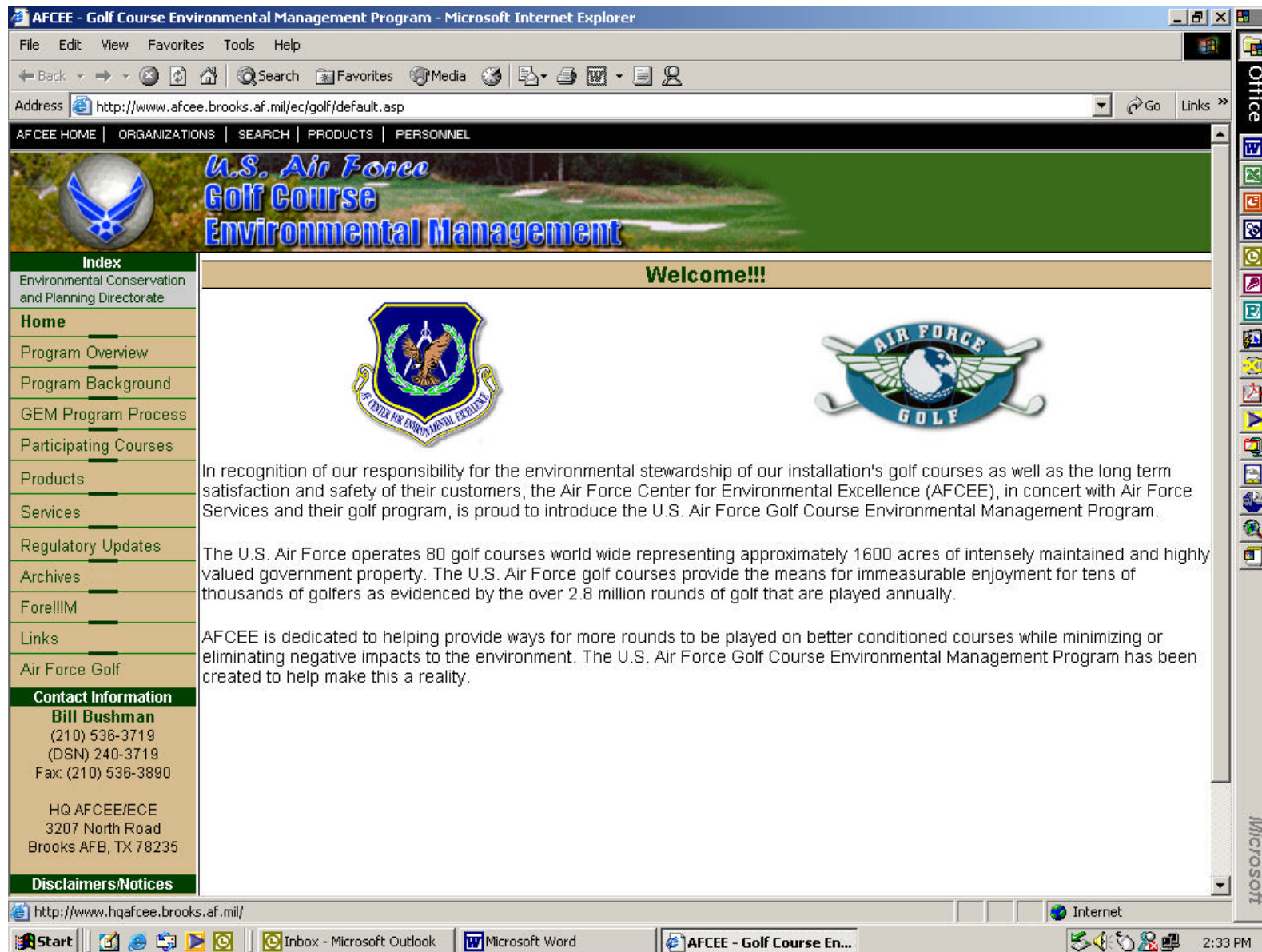
## ***AFCEE***

### ***Golf Support Unit***

- **Activities:**

- **Compiled and launched U. S. Air Force golf course environmental management website**
- **Added GEM Plan requirement to Natural Resources Management Air Force Instruction (AFI 32-7064)**
- **Created database of golf-related ESOH CAMP findings**
- **Provided input on Golf Clubhouse Design Guide**
- **Secured new work for AFCEE**





**GEM Web site**

## ***AFCEE***

### ***Golf Support Unit***

- **New work for AFCEE:**
  - **Environmental assessment for new irrigation well at Andrews AFB**
  - **New golf course concept plan at Buckley AFB**
  - **Emergency airfield planning at Scott AFB (concept plan for relocating 6 holes)**
  - **Groundwater protection at Arnold AFB**
  - **Irrigation water quality issues at Cannon AFB**

## ***AFCEE Golf Support Unit***

- **Future activities:**
  - Create of self-paced golf course environmental management training via AFCEE's Web University
  - Create new U. S. Air Force environmental awards for the installation and individual demonstrating highest levels of environmental stewardship
  - Compile of the U. S. Air Force Golf Course Environmental Management Handbook
  - Add “golf-related” data element to MXT

# ***U. S. Air Force Golf Course Environmental Management***



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